Marcus Spectrum Solutions

Docket 13-111 *ex parte*

"Why not the best?"

Michael J. Marcus, Sc.D., F-IEEE

FCC/OET (Retired)

Adjunct Professor, Virginia Tech ECE

Director, Marcus Spectrum Solutions LLC

mjmarcus@marcus-spectrum.com

Background

- 25 years at FCC
  - OET & EB predecessor
- Teaching and numerous articles on spectrum policy
- Main drafter of South Carolina Department of Corrections petition cosigned by 25 states
- Major contributor to GTL petition
  - **Neither** ever put out for public comment

1985 FCC adoption of rules that are now basis for Wi-Fi & Bluetooth

FCC Policy Problems

- Most FCC policy problems basically involve economic regulation
  - How much spectrum for a new service?
  - Who gets the income from a new service?
  - What is the cost structure of a new service?
  - Amount of competition?
- **This is a very different issue**
  - **Real people die or are seriously injured as a result of this continuing problem**
  - A different calculus is needed to determine public interest factors here

Scope of Problem

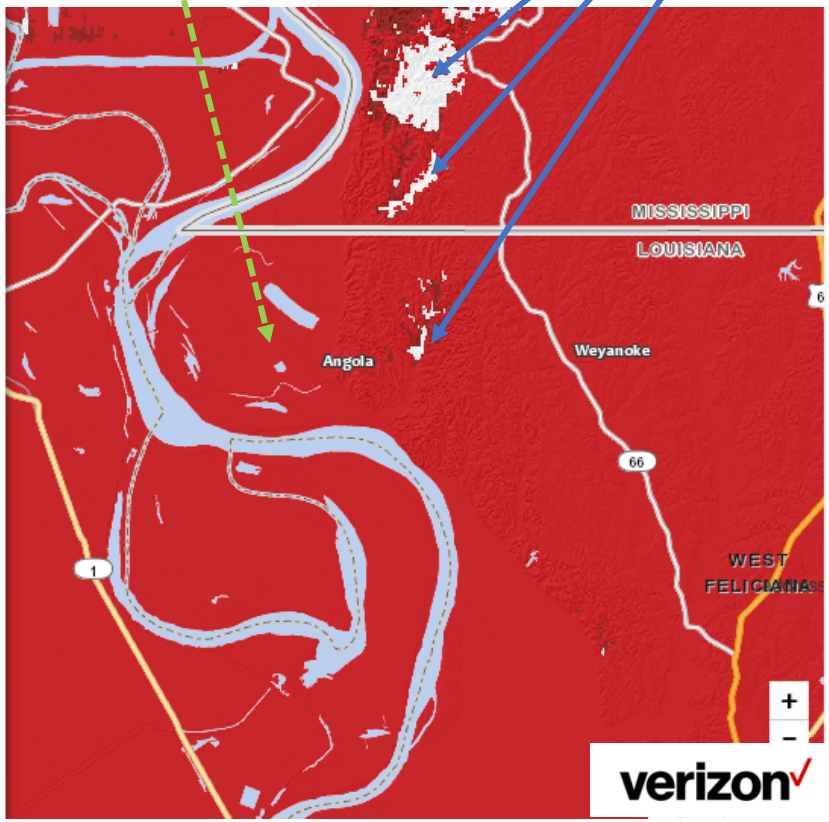
- The use of contraband cellphones in prisons is an unintended consequence of the overwhelmingly positive impact of today's wireless revolution
  - Somewhat exacerbated by the "benign" use of cellphones in response to continuing very high calling rates for legitimate Inmate Calling Services
  - Once in prisons contraband phones can be used for *both* benign uses and dangerous uses
- While some in corrections feel carriers seek to profit from contraband use, more likely they are just "tone deaf"

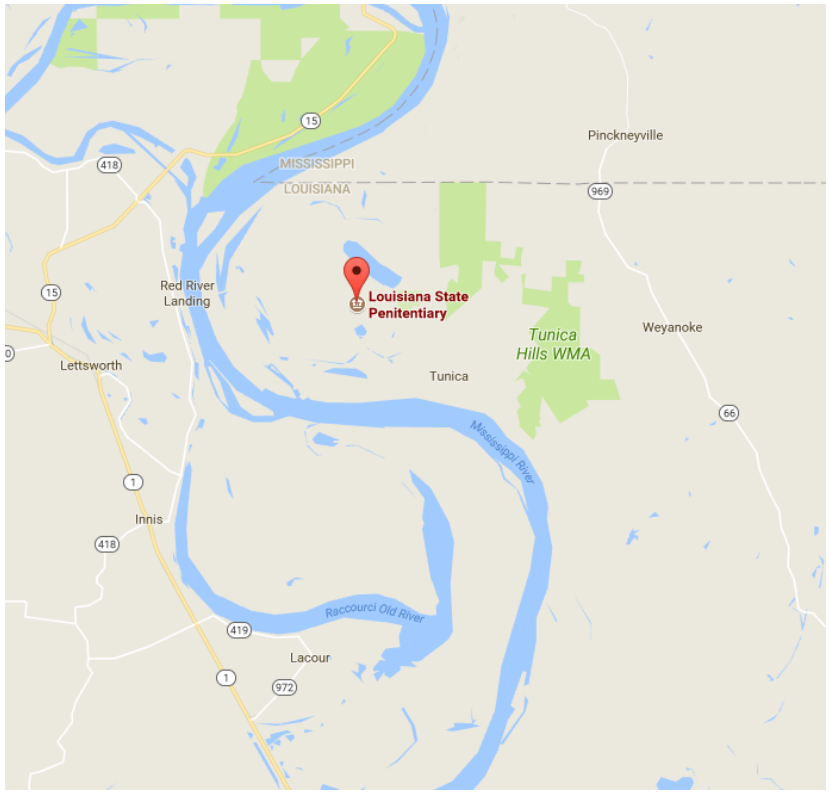
Common question in corrections circles:

Why is cellular service near remote prisons so good?

Louisiana State Penitentiary has excellent Coverage!

Areas **without** coverage





https://www.verizonwireless.com/featured/better-matters/?intmcp=INT-SEA-NON-SE-coverage-051614-DE-SR-LP-T#maps

Is there a “Magic Bullet”?

A simple universal painless cure for the problem?

- We tend to look for simple technical solutions to problems that do not impact large systems
- Contraband cellphone problem is a complex issue with technical and human causes spanning a wide variety of locations

Carriers Possible Goals

- It appears that a top goal of carriers has been to maintain a bright white line that forbids **all** jamming of cellular signals in the US through maintaining a view that § 333 prevents FCC from ever authorizing *any* jamming in *any* context
  - FCC *en banc* has never agreed with this view
  - But *at present* absence of any rule on jamming means jamming is now illegal for NG users
    - While NTIA agrees with carriers, it claims authority to authorize jamming for G users

§333. Willful or malicious interference

No person shall willfully or maliciously interfere with or cause interference to any radio communications of any station licensed or authorized by or under this chapter or operated by the United States Government.

(June 19, 1934, ch. 652, title III, §333, as added Pub. L. 101–396, §9, Sept. 28, 1990, 104 Stat. 850.)

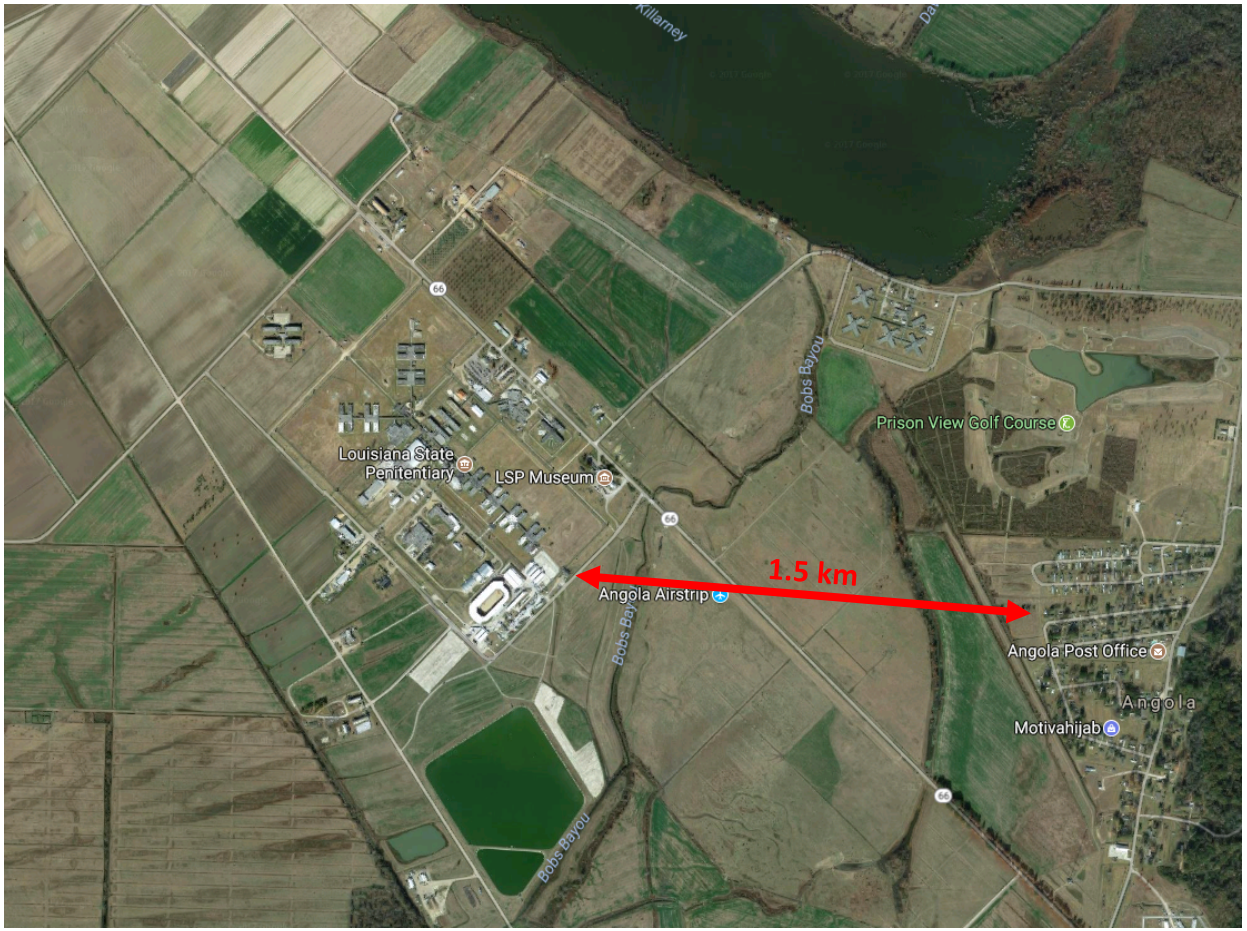
Carriers Possible Goals

- Carriers have consistently tried to block any requirement that would inconvenience them in any way.
- Seek to say that promises of present CTIA members to cooperate should obviate the need for new mandates:
  - Against mandatory or no fee spectrum leases
  - Against requirement for continuing technical coordination of network changes with MAS operator
  - Against rapid turnoff of phones detected within prisons
  - In favor of sniffer dogs but not mandate to make sure future phones have comparable smell

Preference of Carriers

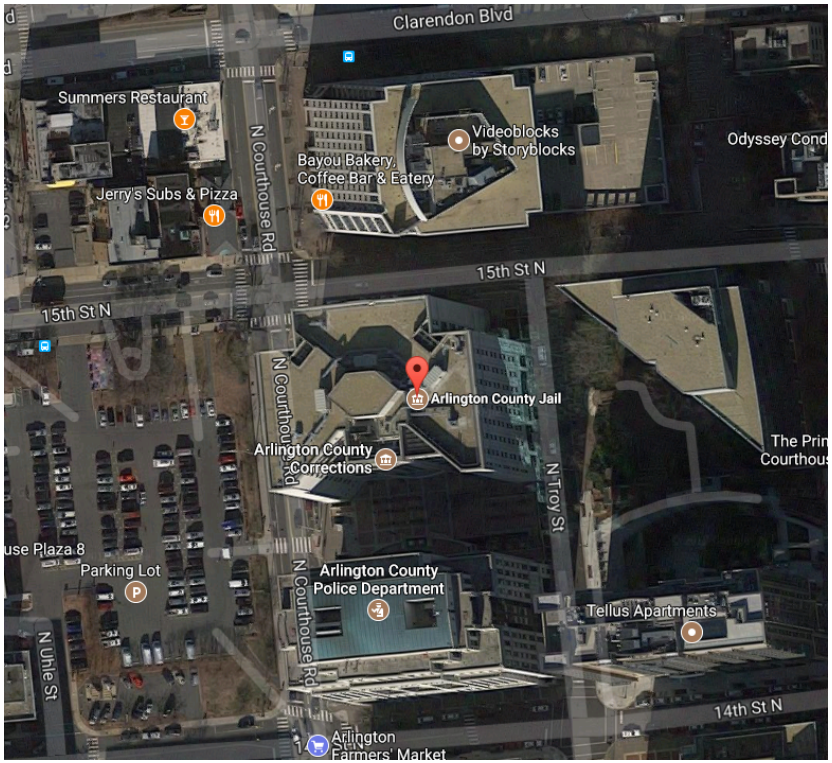
20. Aside from the statutory constraints, wireless providers have indicated a preference for managed access solutions over jamming solutions,[76] on the grounds that managed access "can effectively prevent unauthorized communications without disrupting legitimate users."[77] Wireless providers point to benefits of managed access over jamming solutions including the coordination and leasing process that occurs between the managed access provider and relevant licensees, and to system design that utilizes low power base stations optimized to prevent interference or the unintentional disruption of service to wireless devices operating legitimately outside of the target facility.[78]

Prisons vary greatly in geography



Louisiana State Penitentiary (Angola)

Prisons vary greatly in geography



Arlington County Jail

Prisons vary greatly in geography

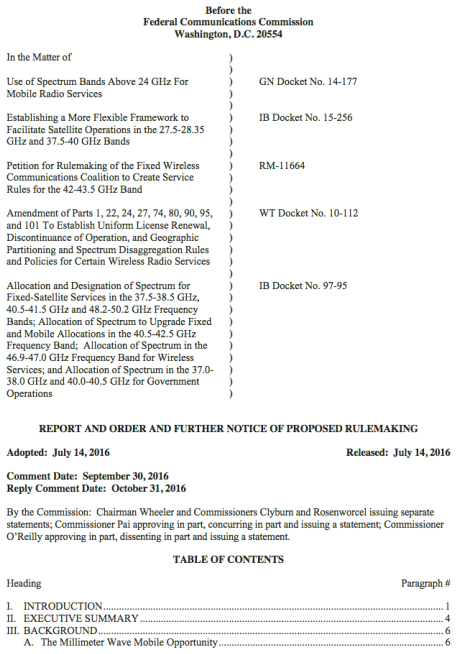
- No single solution works well in all geographies
- Maximum security prisons, especially ones built post WWII, tend to be in rural area with large spatial buffers from areas with public access
  - **These are the sites of *most* of the worst problems**
  - NY's Sing Sing has little buffer to neighbors
- Large spatial buffers allow options not possible in other cases

Since 13-111 NPRM …

Number of Cellular Bands is Increasing!

New Parts of Spectrum Too!

5G Rulemaking



Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Use of Spectrum Bands Above 24 GHz For Mobile Radio Services	)	GN Docket No. 14-177
	)	
Establishing a More Flexible Framework to Facilitate Satellite Operations in the 27.5-28.35 GHz and 37.5-40 GHz Bands	)	IB Docket No. 15-256
	)	
Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band	)	RM-11664
	)	
Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 To Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services	)	WT Docket No. 10-112
	)	
Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations	)	IB Docket No. 97-95

REPORT AND ORDER AND FURTHER NOTICE OF PROPOSED RULEMAKING

Adopted: July 14, 2016 **Released: July 14, 2016**

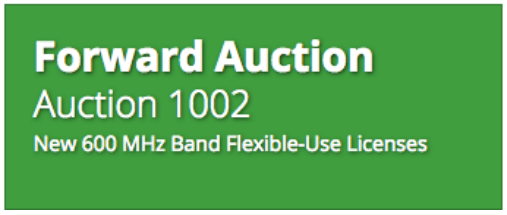
Comment Date: September 30, 2016
Reply Comment Date: October 31, 2016

By the Commission: Chairman Wheeler and Commissioners Clyburn and Rosenworcel issuing separate statements; Commissioner Pai approving in part, concurring in part and issuing a statement; Commissioner O'Reilly approving in part, dissenting in part and issuing a statement.

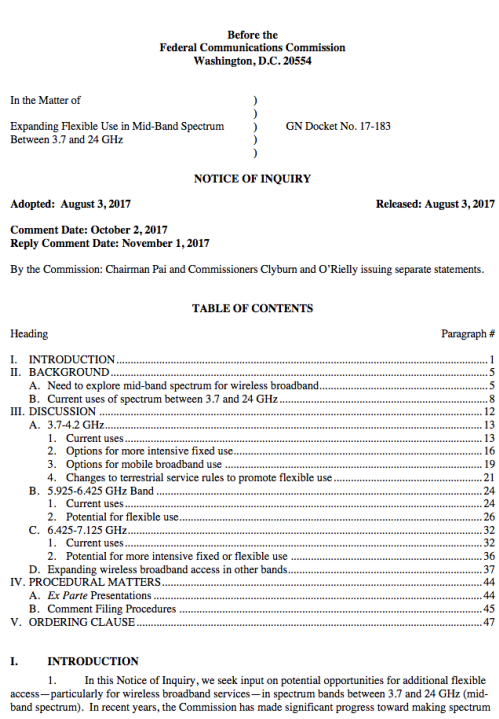
TABLE OF CONTENTS

Heading Paragraph #

Incentive Auction



Mid-Band NOI



Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz	)	GN Docket No. 17-183
	)	

NOTICE OF INQUIRY

Adopted: August 3, 2017 **Released: August 3, 2017**

Comment Date: October 2, 2017
Reply Comment Date: November 1, 2017

By the Commission: Chairman Pai and Commissioners Clyburn and O'Rielly issuing separate statements.

TABLE OF CONTENTS

Heading Paragraph #

I. INTRODUCTION

1. In this Notice of Inquiry, we seek input on potential opportunities for additional flexible access—particularly for wireless broadband services—in spectrum bands between 3.7 and 24 GHz (mid-band spectrum). In recent years, the Commission has made significant progress toward making spectrum

Since 13-111 NPRM …

Number and Frequencies of Cellular Bands is Increasing!

- Not clear who will be cellular licensees when these RMs are finished,
  - Especially in rural areas where many maximum security prisons are
- Nonbinding pledges by present CTIA members may not be applicable for all future carriers near prisons

Long Term use of MAS Requires Continuing Technical Cooperation Between Carriers and MAS Operators

- MAS operation requires use of network features that could change during network evolution
  - Unlike many countries, US carriers have great technical flexibility and are not bound by ETSI or 3GPP standards
- In areas near prisons with MAS or internal ESN detection systems or jamming new, band deployment, base station antenna change or new base station location requires timely changes to countermeasure system to continue effectiveness
  - Rules should provide for mandatory notification and cooperation where these are used

DOJ Statements on 13-111

- "Statute does not necessarily preclude the Commission's authorization of justifiable law enforcement use of targeted jamming to prevent inmates from using contraband cellphones to further their illegal activities"
- MAS is expensive: $1-2M/correctional facility
  - Does not include continuing software maintenance and updating as well as updating for new bands - rumored to be $100-200k/year
- We note that *Chevron* doctrine does <u>not</u> apply to DOJ

Possible Legal Basis for Jamming
(From GTL Petition)

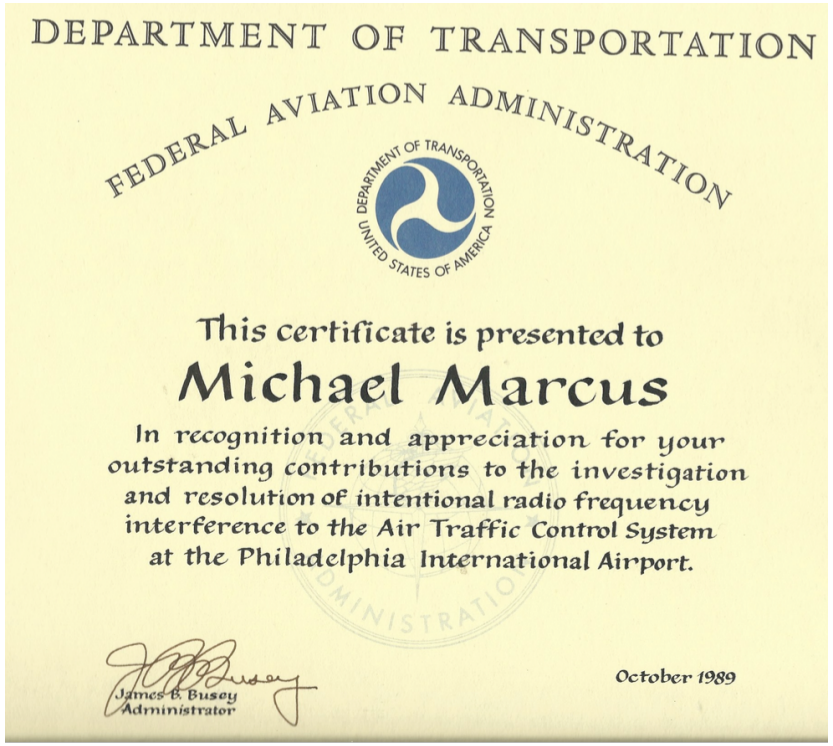
- Alternative 1:
  - Neither text of §333 nor its legislative history preclude FCC from authorizing jamming

§333. Willful or malicious interference

No person shall willfully or maliciously interfere with or cause interference to any radio communications of any station licensed or authorized by or under this chapter or operated by the United States Government.

(June 19, 1934, ch. 652, title III, §333, as added Pub. L. 101–396, §9, Sept. 28, 1990, 104 Stat. 850.)

  - Commission <u>asked</u> for §333 in order to criminalize jamming even if it involved a licensed transmitter
    - FCC did <u>not</u> ask Congress to remove any previous authority to permit jamming



DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

This certificate is presented to

Michael Marcus

In recognition and appreciation for your outstanding contributions to the investigation and resolution of intentional radio frequency interference to the Air Traffic Control System at the Philadelphia International Airport.

James B. Busey
Administrator

October 1989

§333 was in response to this incident where criminal prosecution under §301 was not possible

Possible Legal Basis for Jamming
(From GTL Petition)

- Alternative 2:
  - Assume *arguendo* that §333 prohibits NG jamming, it must also prohibit all jamming by federal users since §305 only excludes feds from §§301,303 not all of Title III
  - Nearly contemporary 18 U.S.C. §1367 criminalizes satellite jamming but has explicit exemption for federal law enforcement and intelligence agencies
    - **Both statutes were requested by FCC!**
  - NTIA has always claimed the right to authorize jamming and FCC has never challenged NTIA's discretion

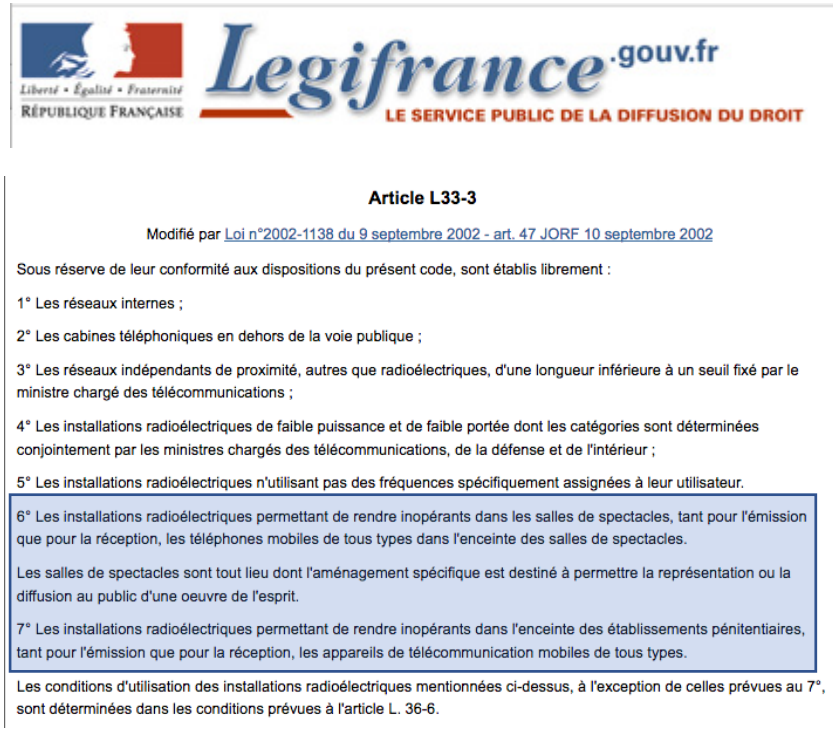
Possible Legal Basis for Jamming
(From GTL Petition)

- Alternative 3:
  - Amending § 22.3 of the Commission's Rules to end cell phone transmissions within prisons from being "authorized communications" if prison leadership requests such a change
  - Many states forbid possession and use of private transmitters within prisons
  - Then cellphones in prisons would not be "licensed" within the context of §333

Anonymous Prepaid "Burner" Phones Are Part of Problem

- In many countries anonymous prepaid phones and SIMs are illegal
  - Often for counter terrorism reasons
- While there are legitimate needs in limited cases for prepaid phones that are hard to trace, *e.g.* battered spouses, the general availability of anonymous phones facilitates a wide variety of criminal activity
- Would identification mandate have a large negative impact on legitimate prepaid market?
  - Since 2005 federal legislation has required have required positive ID for Sudafed purchases – another "dual use" product

Jamming in other countries



Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

Legifrance.gouv.fr
LE SERVICE PUBLIC DE LA DIFFUSION DU DROIT

Article L33-3

Modifié par Loi n°2002-1138 du 9 septembre 2002 - art. 47 JORF 10 septembre 2002

Sous réserve de leur conformité aux dispositions du présent code, sont établis librement :

1° Les réseaux internes ;

2° Les cabines téléphoniques en dehors de la voie publique ;

3° Les réseaux indépendants de proximité, autres que radioélectriques, d'une longueur inférieure à un seuil fixé par le ministre chargé des télécommunications ;

4° Les installations radioélectriques de faible puissance et de faible portée dont les catégories sont déterminées conjointement par les ministres chargés des télécommunications, de la défense et de l'intérieur ;

5° Les installations radioélectriques n'utilisant pas des fréquences spécifiquement assignées à leur utilisateur.

6° Les installations radioélectriques permettant de rendre inopérants dans les salles de spectacles, tant pour l'émission que pour la réception, les téléphones mobiles de tous types dans l'enceinte des salles de spectacles.

Les salles de spectacles sont tout lieu dont l'aménagement spécifique est destiné à permettre la représentation ou la diffusion au public d'une oeuvre de l'esprit.

7° Les installations radioélectriques permettant de rendre inopérants dans l'enceinte des établissements pénitentiaires, tant pour l'émission que pour la réception, les appareils de télécommunication mobiles de tous types.

Les conditions d'utilisation des installations radioélectriques mentionnées ci-dessus, à l'exception de celles prévues au 7°, sont déterminées dans les conditions prévues à l'article L. 36-6.

- Reports of authorized prison use of jamming in Australia and UK
- CTIA claimed in video formerly on its website that prison jamming in Brazil caused interference miles away
  - Provided no details
- FCC should ask counterparts for policies & actual experience

https://www.legifrance.gouv.fr/affichCodeArticle.do?idArticle=LEGIARTI000006465759&cidTexte=LEGITEXT000006070987&dateTexte=20040709

“Overjamming”: CTIA’s Contribution to the English Language

- CTIA introduced the concept of “overjamming” to FCC and the English language as part of their battle against prison jamming
  - Viewed as inevitable for prison jamming system under all circumstances
  - But never mentioned in the context of MAS which by implication never had this problem
- But excess coverage of ***any*** countermeasure depends on spatial buffer size around protected area
  - Which varies greatly among prisons

Geolocation Based Denial

NPRM invited comment on “other technological solutions”.

- Only feasible in prisons with large spatial buffers
  - But these are generally the prisons with the worst problems
  - In reality other approaches generally also need buffers
- Builds on existing E911 technology
- FCC could require for all cell towers near prisons with buffer that is large enough if requested by responsible agency
  - In a rare cases *might* require additional cell tower for for better geometry/GDOP

Conclusions

- There is no one simple solution that is universal
- Prison geography is a key factor in selecting solutions
- Prohibition of jamming is w/o legal basis and assumes unrealistic simple alternative
- Most technical solutions require mandatory continuing interaction on network changes between all carriers near prison and prison administrators
- Some question as to who carriers will be in long term due to new bands & market changes may require more mandates than industry prefers today